

Appendix H: Analysis of SF₆ Concentration Data for Test 10

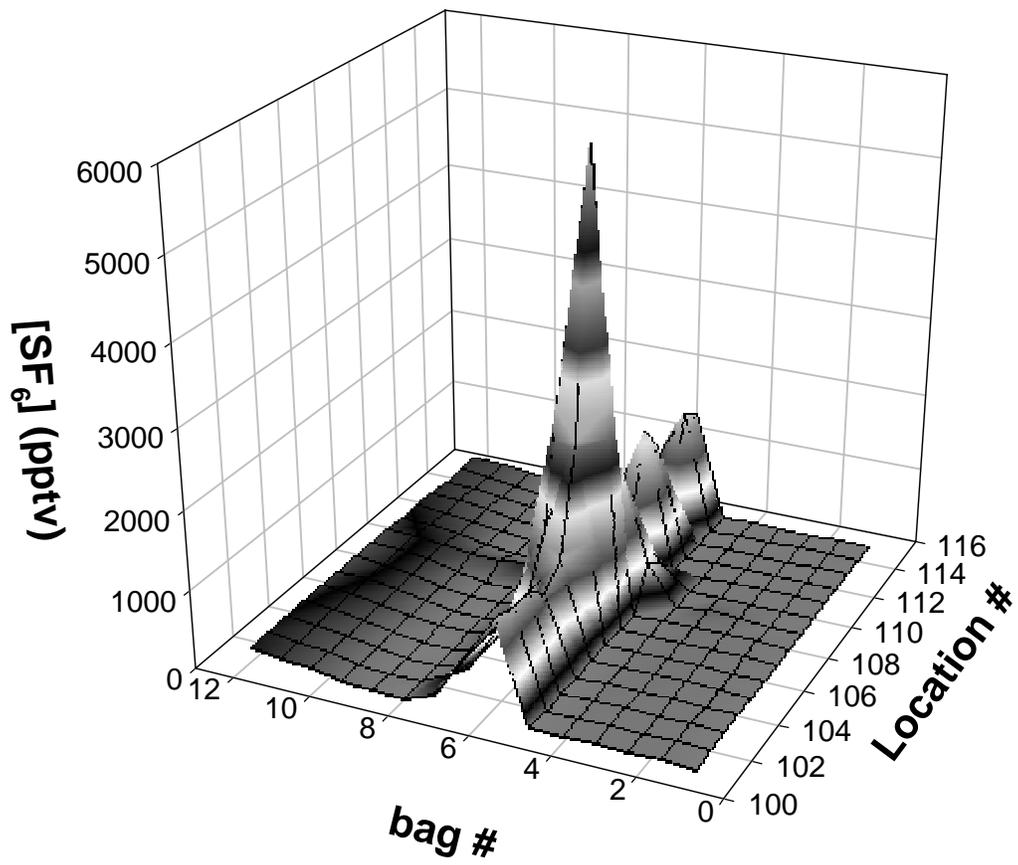


Figure H1. Whole air sampler data for Test 10, Line 1.

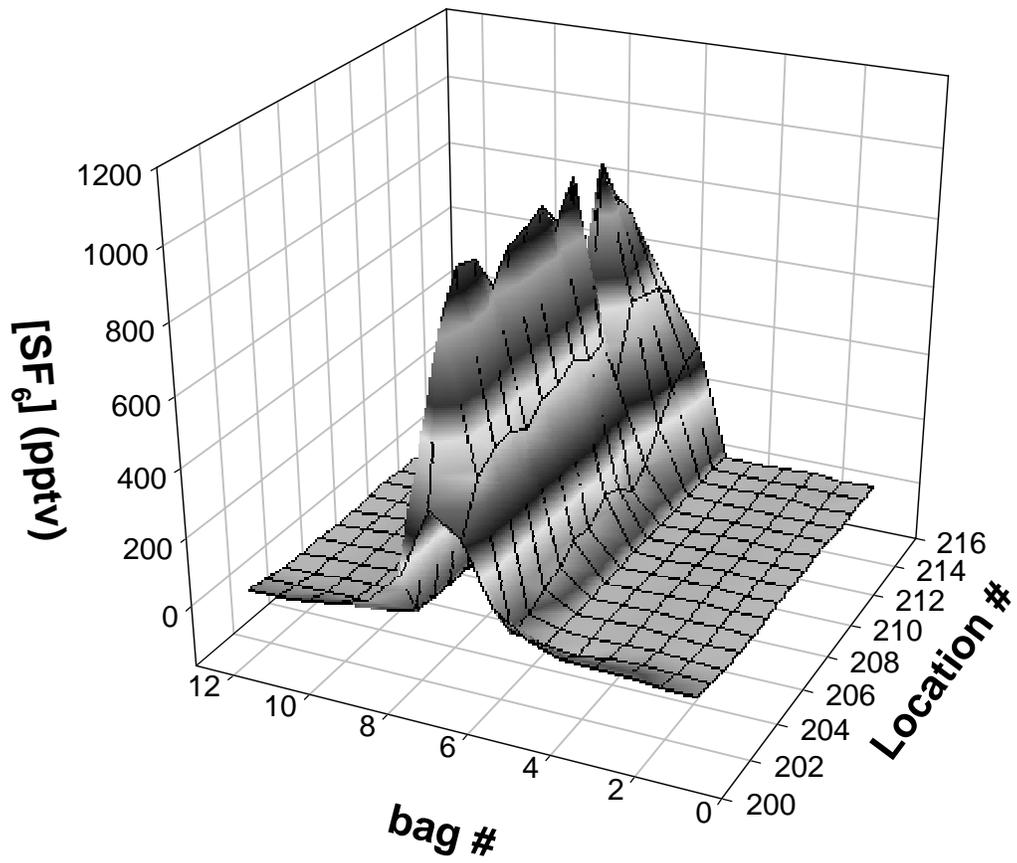


Figure H2. Whole air sampler data for Test 10, Line 2.

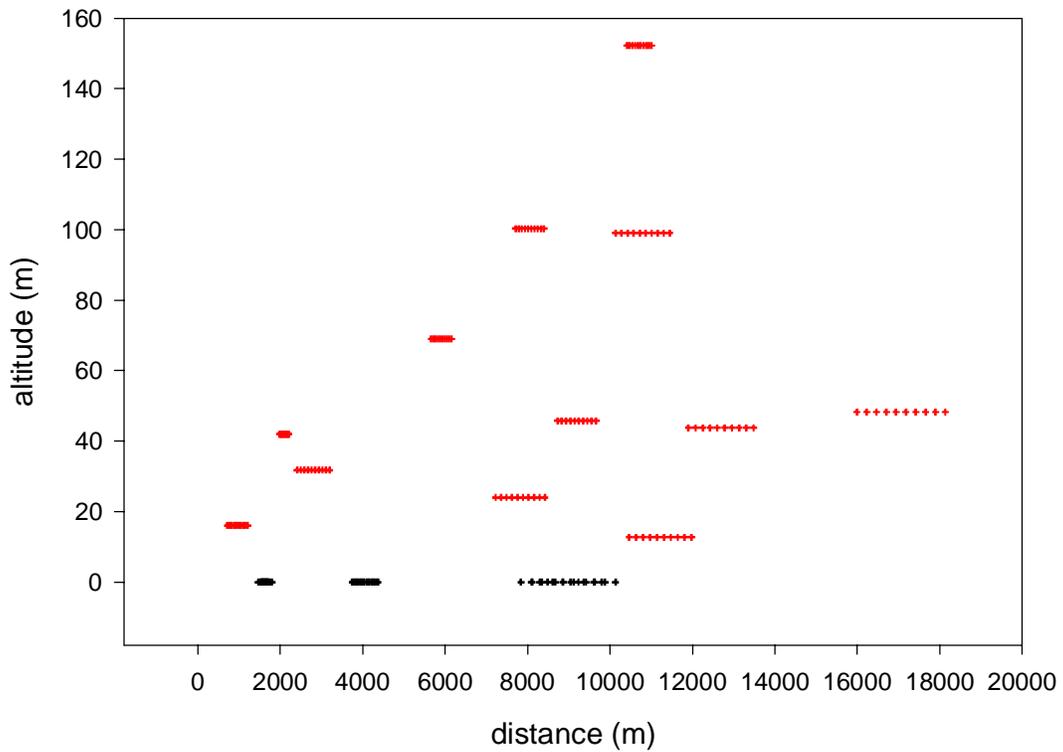


Figure H3. Test 10 continuous analyzer data. Altitude versus downwind distance. The red crosses are aircraft measurements. The black crosses are ground measurements at sampling Lines 1, 2, and 3. The width is $\pm 1\sigma$ from the position of peak concentration.

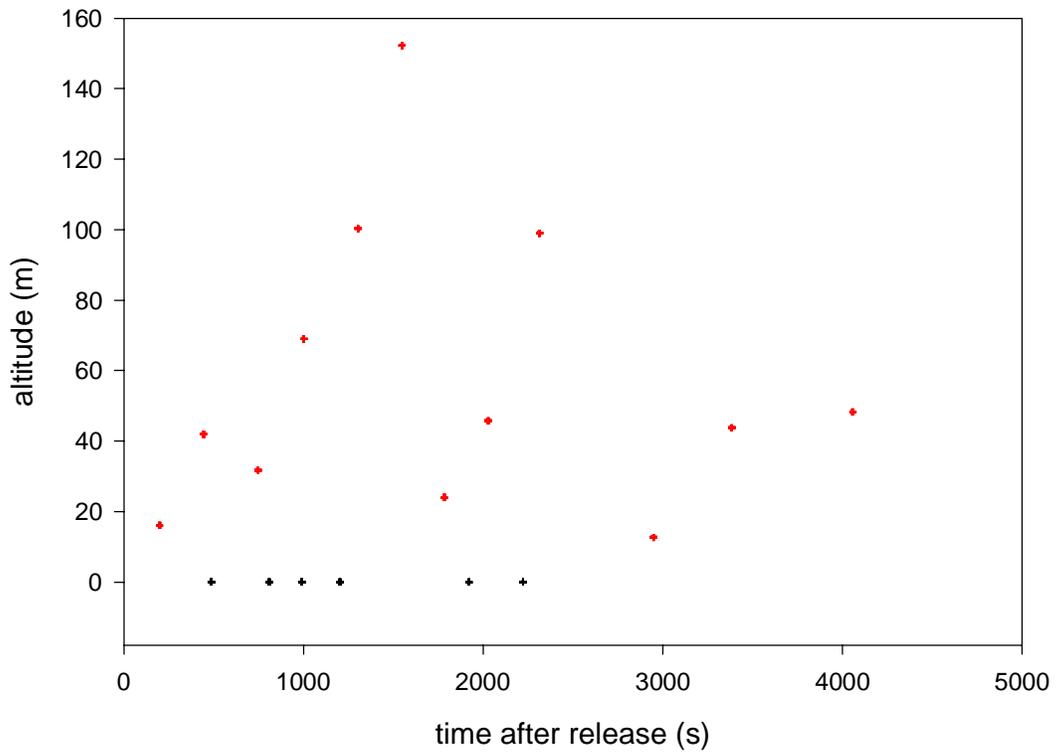


Figure H4. Test 10 continuous analyzer data. Altitude versus time after release. The red crosses are aircraft measurements. The black crosses are ground measurements at sampling Lines 1, 2, and 3.

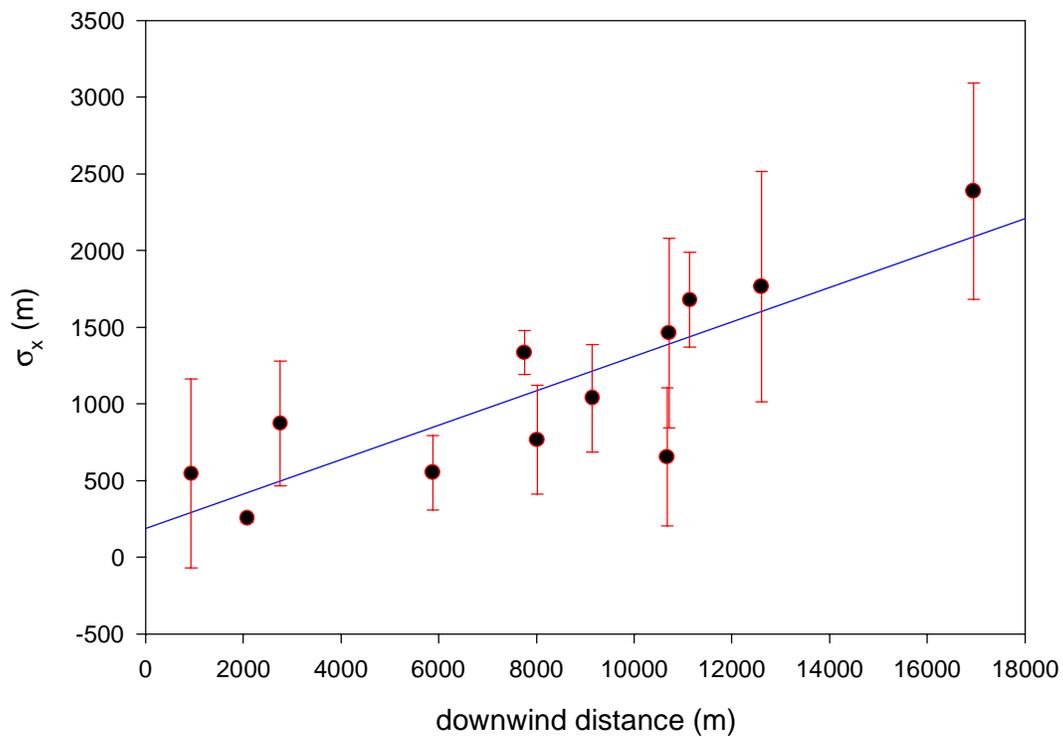


Figure H5. Test 10 σ_x versus downwind distance from aircraft continuous analyzer measurements. Data is from all altitudes. The blue line is a linear fit to the data with the equation $\sigma_x = (0.11 \pm 0.02)x + (200 \pm 200)$, $r^2 = 0.7$.

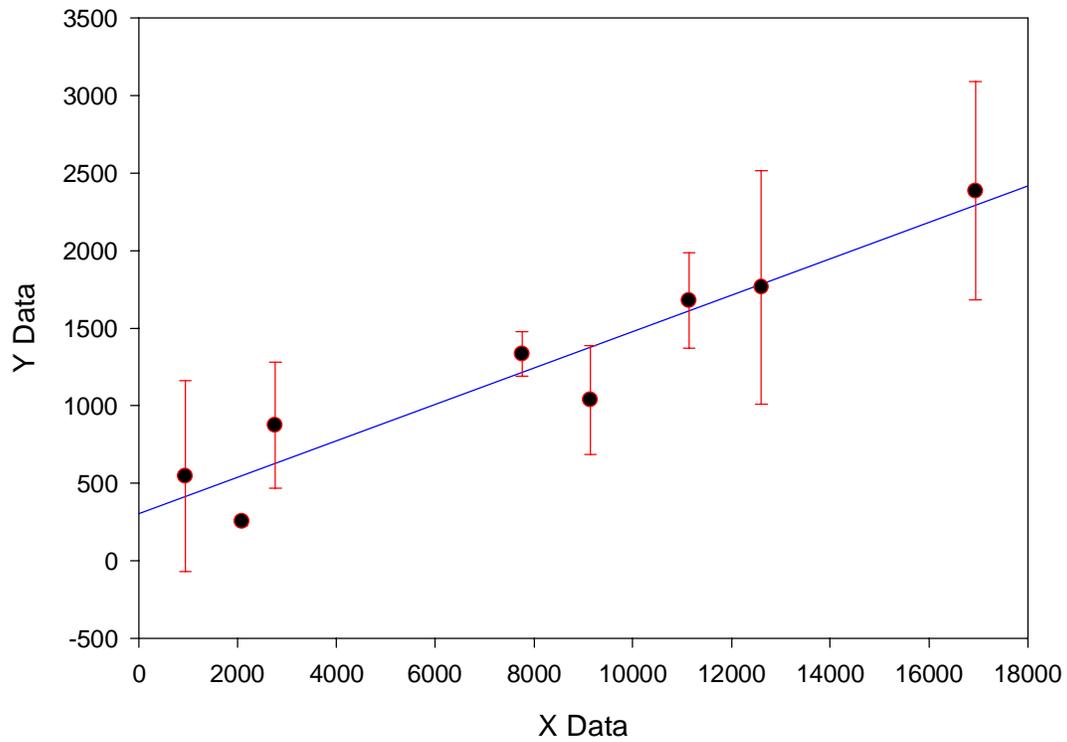


Figure H6. Test 10 σ_x versus downwind distance from aircraft continuous analyzer measurements. Data is from altitudes less than 50 m. The blue line is a linear fit to the data with the equation $\sigma_x = (0.12 \pm 0.02) x + (300 \pm 140)$, $r^2 = 0.9$.

Table H1. Test 10 sampling line SF₆ concentration variability.

ID	WS (m s ⁻¹)	σ_{ws} (m s ⁻¹)	θ (deg)	σ_{θ} (deg)	mrsd	σ_{mrsd}	N
Line 100	2.3	0.6	161	22	1.3	1.2	12
Line 200	2.2	0.8	157	30	0.4	0.3	12
Line 300	2.3	0.8	150	30	0.3	0.3	12
All					0.7	0.8	36
0 - 100 pptv					0.7	0.9	29
100 - 500 pptv					0.6	0.4	5
> 500 pptv					0.4	0.5	2

Table H2. Test 10 sampling line SF₆ concentration variability by line for each sampling bag.

Line 100				Line 200				Line 300			
Bag	Mean SF ₆ (pptv)	σ_{SF_6} (pptv)	rsd	Bag	Mean SF ₆ (pptv)	σ_{SF_6} (pptv)	rsd	Bag	Mean SF ₆ (pptv)	σ_{SF_6} (pptv)	rsd
1	9	3	0.4	1	5	4	0.6	1	5	1	0.3
2	16	4	0.2	2	4	0	0.1	2	4	1	0.1
3	7	2	0.2	3	4	0	0.1	3	4	0	0.1
4	13	3	0.2	4	5	1	0.3	4	4	1	0.1
5	5	1	0.2	5	8	1	0.2	5	5	1	0.2
6	2043	1573	0.8	6	139	125	1.0	6	6	1	0.2
7	47	54	1.2	7	1002	118	0.1	7	253	74	0.3
8	13	18	1.4	8	18	8	0.4	8	490	102	0.2
9	27	77	2.8	9	6	1	0.1	9	152	75	0.5
10	31	99	3.2	10	5	3	0.5	10	31	34	1.1
11	25	69	2.7	11	5	3	0.6	11	5	1	0.2
12	15	36	2.4	12	5	4	0.7	12	5	2	0.3

Table H3. Test 10 SF₆ transport parameters from ground-based continuous analyzers.

	Location					
	101	115	201	215	301	315
WS (m s ⁻¹)	2.3		2.2		2.3	
σ_{ws} (m s ⁻¹)	0.6		0.8		0.8	
θ (deg)	161		157		150	
σ_{θ} (deg)	22		30		30	
V _{SF6} (m s ⁻¹)	2.2	3.6	3.5	4.3	4.7	4.08
Error Limit V _{SF6} (m s ⁻¹)	0.3	0.7	0.2	0.3	1.2	0.7
σ_x (m)	184	370	633	697	2553	1871
Error Limit σ_x (m)	24	160	112	54	1175	1085
SF ₆ Transport Time (s)	810	488	1203	991	1921	2222
Error Limit SF ₆ Transport Time (s)	94	95	72	64	490	385
SF ₆ Peak (pptv)	6970	6806	2344	2245	696	652
Error Limit SF ₆ Peak (pptv)	395	2100	433	98	264	236

Table H4. Test 10 SF₆ transport parameters from aircraft continuous analyzer.

	Pass							
	1	2	3	4	5	6	7	8
SF ₆ Speed (m s ⁻¹)	4.6	4.6	3.6	5.8	6.1	6.8	4.3	4.5
Error SF ₆ Speed (m s ⁻¹)	0.50	0.06	0.10	0.10	0.02	0.10	0.08	0.08
σ _x (m)	550	250	870	550	770	660	1330	1040
Error σ _x (m)	620	30	410	240	360	450	140	350
Peak Detection Time (s)	200	440	750	1000	1300	1550	1780	2030
Error Peak Detection Time (s)	11	11	11	11	11	11	11	11
Peak Concentration (pptv)	6270	6210	2470	1020	230	80	790	530
Error Peak Concentration (pptv)	3520	110	840	420	120	40	30	180
Altitude (m)	20	40	30	69	100	150	20	50
Downwind Distance (m)	900	2100	2800	5900	8000	10700	7800	9100
Error Downwind Distance (m)	100	30	100	200	40	200	100	200

Table H4. Test 10 SF₆ transport parameters from aircraft continuous analyzer (continued).

	Pass							
	9	10	11	12	13	14	15	16
SF ₆ Speed (m s ⁻¹)	4.6	3.7	3.7	4.1				
Error SF ₆ Speed (m s ⁻¹)	0.13	0.09	0.00	0.03				
σ _x (m)	1460	1680	1760	2390				
Error σ _x (m)	620	310	750	700				
Peak Detection Time (s)	2310	2950	3380	4060				
Error Peak Detection Time (s)	12	11	11	11				
Peak Concentration (pptv)	320	270	200	100				
Error Peak Concentration (pptv)	110	40	80	20				
Altitude (m)	100	10	40	48				
Downwind Distance (m)	10700	11100	12600	16900				
Error Downwind Distance (m)	300	300	30	100				